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THE EFFICACY OF COLD-WATER TREATMENT IN TYPHOID FEVER.¹

BY O. W. DOE, M. D.

SINCE Brand, in Germany, first made known his investigations relating to the use of cold water in the treatment of typhoid fever, clinical researches have given rise to different conclusions regarding its beneficial results, which perhaps may be dependent upon the various methods of its application.

The method pursued by Brand was to place the patient, at the very commencement of the disease if possible, in a bath at a temperature of 68° Fahr., and to pour over the head for two minutes water at a temperature of from 43° to 47° Fahr. Friction was kept up on the limbs under water for five minutes, and the patient was then allowed to rest quietly in the bath for ten minutes longer, when, without being dried, he was removed to bed and lightly covered. These baths were repeated every three hours until the temperature in the rectum measured 101°.

Others make use of a bath at a temperature of from 50° to 60° Fahr., continued from ten to fifteen minutes, or until the patient has a chill.

Liebermeister sometimes recommends shower baths, or, for children and for those persons of a naturally weak constitution, cold packing, continued from ten to twenty minutes, and repeated from three to seven times at very short intervals. He considers four packings equal to a bath of ten minutes' duration at a temperature of 68° Fahr.

Ziemssen advises placing the patient in a bath at 86° Fahr., and gradually reducing the temperature by the addition of cold water.

My object in the present paper is to offer the results derived from the different methods of treatment pursued by Professor Friedreich in his clinic at the hospital in Heidelberg. For the facts herein contained I am indebted to his assistant, Dr. Friedrich Schultze, who has made a very careful study of the cases, and has kindly allowed me to make use of the results obtained from his investigations.

The cases, numbering in all six hundred and forty-eight, extended over a period of ten years, from 1864 to 1873 inclusive, and were divided into three different series.

In the first four years the cases were treated without baths, excepting when symptoms of coma supervened, and then a bath of 95° Fahr. was given, combined with affusion of cold water over the head.

In the three following years the treatment consisted in the administration of two baths a day at a temperature of 90.5°, cooled down to 72.5°, and continued for half an hour; occasionally cold packing of the entire body was practiced.

During the last three years the cases were treated according to a systematic method of heat abstraction in the following manner. As soon as the

¹ Read before the Boston Society for Medical Observation, December 20, 1875.



thermometer in the axilla showed a temperature of 102.5° , a full bath was given, and continued from fifteen to twenty minutes, with a temperature usually of from 72.5° to 77° ; the lowest being 68° and the highest 86° . While the patient was in the bath, water at a temperature of from 41° to 59° was poured twice or three times over the head. In addition to these cold baths, the patient, in the interval, was placed upon rubber cushions, of the size of the mattress and filled with water at a temperature of from 50° to 59° , increased even to 80° if the patient was of a very delicate constitution. In the case of those who were previously very strong and robust, ice-bags were also used, being placed upon the chest and abdomen.

The contra-indications to this very energetic mode of treatment were collapse, perforation of the bowels, and intestinal hæmorrhage; cases of organic cardiac affections received only moderately cool baths.

During the ten years in which these observations were made, the internal treatment was not essentially altered; it consisted usually in the administration of calomel in the early stages of the disease, followed by acid drinks and the occasional use of quinine in large doses; so that the relative results obtained are in no way affected by the internal treatment, inasmuch as it was the same in all the cases.

In comparing the first seven years — during the first four of which no baths were given unless coma supervened, while in the last three they were only imperfectly administered — with the last three years, when the baths were systematically given according to thermometric indications, we find the mortality-rate diminished from 11.2 to 6.7 per cent.; and if we select only those cases of a severe type, we find a difference of 5.5 per cent. in favor of the latter method of treatment. If we take those cases in which no baths at all were given, and compare them with those of a similar character in the last series, we find among two hundred and sixty of the former a death-rate of 14.2 per cent.; and among one hundred and sixteen of the latter only 10.3 per cent., a difference of nearly 4 per cent. The change in treatment made at the commencement of the second series, when two prolonged baths of half an hour each were daily given in place of entire freedom from cold baths, was attended with an increase in the mortality-rate from 14.6 to 20 per cent.; and during the two succeeding years, in which this treatment was followed, the death-rate was respectively 23 and 18.1 per cent. It is interesting to notice that in the year 1865, when 86.6 per cent. of the cases treated were of a severe type, without baths the mortality-rate was only 12.5 per cent.; while in the year 1869, when only 67.5 per cent. of the cases were of a severe form, under the treatment of two baths a day the mortality was 23 per cent., an increase of ten per cent., when there was a decrease in the severity of the disease of 19 per cent.

With the commencement of the systematic method of heat abstraction as practiced in the last series, the mortality fell immediately from 18.1 to 9 per cent. Other observers, Wunderlich for example, comparing the results of Brand's method with those of other systems of treatment in their own practice, report a decrease from 18.1 to 7.2 per cent.; Jürgensen from 30.2 to 7.5 per cent.; Liebermeister from 26.2 to 9.7 per cent. These results, though very encouraging, fall far short of the success obtained by Brand, who reports no fatal

case among the eighty-nine patients thus treated in 1870 and 1871; and never a fatal result where he had attended the patient from the very commencement of the disease.

As regards the influence of this method of treatment by frequent cold baths upon the different phases of the disease, it was noticed that in the first series without baths 15 per cent. manifested severe cerebral complications, in the second series 28 per cent., and in the last only 6 per cent.; and it was especially noticeable that when this complication existed it was much milder in those cases treated with baths than in those not so treated.

Previously to the investigations of Schultze, most observers noticed neither an increase nor a decrease of pulmonary or pleuritic affections; but his observations showed that in the first series 10 per cent. were affected with atelectasis or hypostasis, in the second 10.6 per cent., and in the last only 5 per cent. Croupous pneumonia occurred six times in three hundred and forty-nine cases treated without baths, and only twice in two hundred and thirty-seven cases with baths. The frequency of pleuritic affections and the continuance of the bronchial catarrh seemed to be unaffected, excepting that in bronchitis the cold bathing appeared to act as a powerful expectorant; this was attributed by Schultze to its tonic action, removing that condition of apathy in which the irritation and desire to cough were not experienced.

The baths, through their enforced cleanliness and stimulating effect upon the capillary circulation, reduced the frequency of bed-sores to almost a minimum; this complication occurred in only 3.8 per cent., whereas previously to the use of the baths it had existed in 11 per cent. of the cases treated. The frequency of the formation of thrombi was also found to be diminished from 3 per cent. before to 1.6 per cent. after the use of the baths, and almost always affected the femoral vein, more often the left than the right.

This method of treatment seemed to exert a very favorable effect also on the tendency manifested by the disease to relapse, as shown by comparing the first three with the last three years; in the former 15 per cent. suffered from relapse, while in the latter only 5 per cent. I find also that in the clinic of Professor Ziemssen, at Munich, during the year 1874 only 4.5 per cent. of the cases similarly treated suffered a relapse.

If we compare the duration of the disease in the two series, we find that in the former, in which the patients did not have baths, the average course was twenty-seven and one fourth days, while in the latter, in which baths were used, it was twenty-three days, the longest periods being respectively one hundred and sixty-four and one hundred and forty-three days.

In all the cases under treatment meteorism was observed only four times in a severe form, its rarity being attributed by Professor Friedreich to the administration of calomel at the commencement of the disease. He asserts that he never saw this symptom occur but once when calomel had been given in the early stage of the attack.

Thus far we have seen only the beneficial effects of the cold-water treatment; but if now we look to the frequency of the occurrence of intestinal hæmorrhage, we find that this method of treatment exerts a very serious influence thereon. Wunderlich found in his clinic at Leipzig that the frequency of this complication

was increased, though fortunately not the mortality. Professors Ziemssen and Gerhardt have also referred to its increased frequency. Schultze, in his investigations, found it to occur in 5.3 per cent. of the cases treated without baths, and in 10.9 per cent. of those treated with baths; and among the latter, three had a second attack of hæmorrhage, an occurrence never observed in those cases treated without baths. The possibility that this was dependent upon a more hæmorrhagic character of the disease during the last three years is excluded by the fact that in those patients treated outside of the hospital, where the cold baths were not administered, the number of hæmorrhagic cases fell from 10.9 to 5 per cent. The hæmorrhage usually occurred in from one to three hours after the bath. It was noticed that cases of heart-disease complicating typhoid fever were much more prone to hæmorrhage than others; two cases occurred in seven thus affected.

The frequency of neuralgia of the different nerve-trunks was also noticeably increased; it occurred in 5.5 per cent. of the cases treated with baths, and in only 1.2 per cent. of those not receiving baths. Another undesirable effect was the marked hyperæmia of the lower extremities occasionally observed, continuing until the baths were suspended.

Aside from the treatment, the following peculiarities were noticed at the Heidelberg clinic. In the primary stage of the disease stiffness and pain in the cervical muscles were observed in twenty-three of the six hundred and forty-eight cases, sometimes so severe as to simulate spinal meningitis; this symptom I have myself noticed in a recent case under my own care, and in so severe a form as to mask the real disease throughout the first week.

In seventy cases the disease was ushered in with a chill, though, if a relapse followed, this symptom was seldom observed; and it was also noticed that usually in those attacks beginning with a chill and sudden high rise of temperature, the disease ran a mild course. This fact was observed by Jürgensen also.

The roseola was usually apparent at the end of the first week; in no case earlier than the fifth or later than the twelfth day.

Enlargement of the spleen was noticed in all of the six hundred and forty-eight cases excepting thirty-five, and in two hundred and twenty-one patients it was so large as to be felt below the ribs. Professor Friedreich lays great stress upon this splenic enlargement as a diagnostic point in typhoid fever, and considers it the earliest tangible evidence of the disease, even observable before any rational symptoms manifest themselves. He considers this not only an early symptom, but also the last to disappear, and believes that as long as there remains any enlargement of the spleen there is always danger of relapse. He diagnosticated an impending typhoid at one time from accidentally detecting an enlarged spleen in the person of his assistant, who, notwithstanding, expressed himself as feeling perfectly well. Within the next three days the supervention of other symptoms of a severe form of typhoid confirmed his diagnosis.

Professor Friedreich maintains that by the administration of twelve grains of calomel at the beginning of the disease its course may be checked, or at least rendered very mild; his confidence in this is such that he feels justified in speaking of it as the abortive treatment of typhoid fever.



